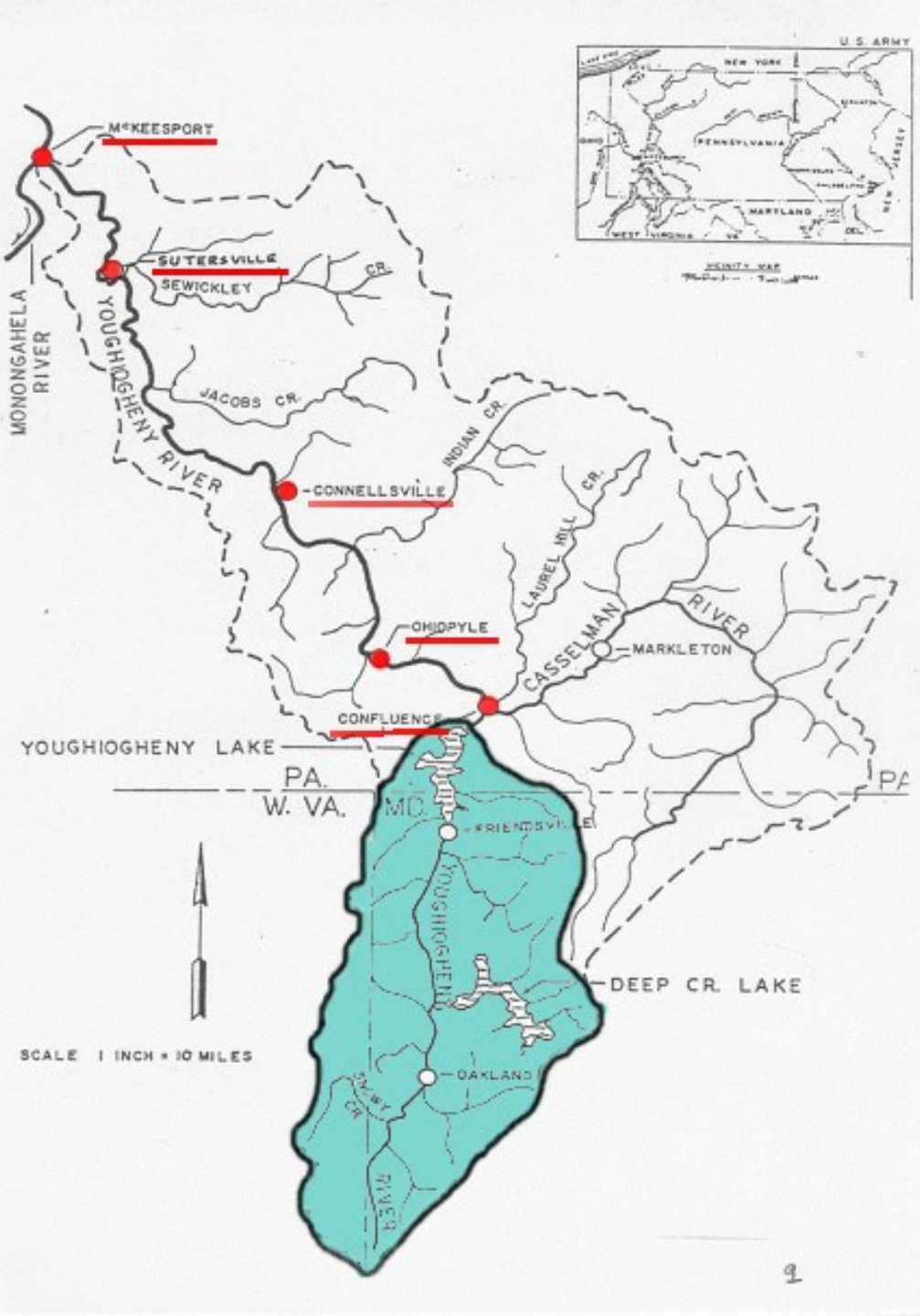
Youghiogheny River Lake Storage ReAllocation for Downstream Water Supply

by
Werner C. Loehlein, P.E.

Uncontrolled

rea controlled by Youghiogheny Lake
434 square miles



Youghiogheny River Watershed

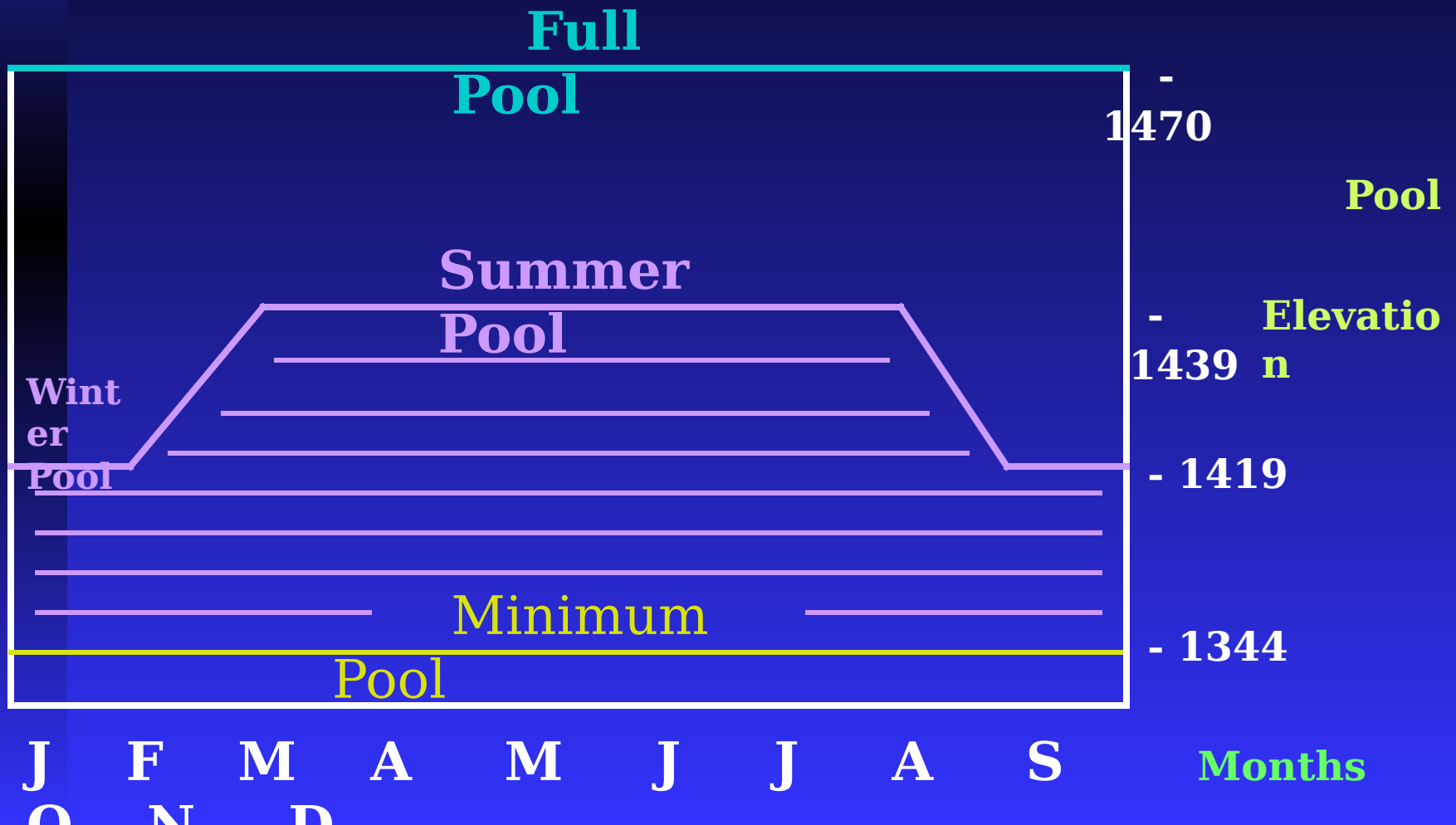
Drainage areas

- Total Basin = 1,764 square miles
- Youghiogheny River Lake = 434 square miles
  - Controls 25% of total basin
- Connellsville = 1,326 square miles
  - Percent controlled = 33%

Youghiogheny River Lake

- In 1936, was authorized for the purposes of:
  - Reducing flood stages (flood control) and
  - Low water regulation for water quality control along the Youghiogheny, lower Monongahela, and upper Ohio Rivers

Youghiogheny River Lake Storage Schedule



Youghiogheny River Lake

- After Youghiogheny dam was placed in operation, Congress granted general authority to all Corps reservoirs for the following limited purposes:
  - Recreation
  - Fish and wildlife conservation
  - Threatened & endangered species preservation
- However, no storage was allocated or

Youghiogheny River Lake

- In 1988, downstream (whitewater rafting) and upstream recreation was added as an authorized project purpose.
- No storage was allocated or reallocated to this purpose.
- "… operated in such manner as will protect and enhance recreation associated with such project" and to the extent that recreation is compatible with other project purposes.

Youghiogheny River Lake

- In 1989, commercial hydropower was added to the facility.

- The hydropower that is currently being generated, however, does not require any change from the previous operational procedures, and as a result is not a project purpose.

Yough River Lake
Water Management & Reallocation Study
Chronology

1991 A severe drought occurred during the year.

For the first time, the MAWC exceeded the 20-MGD for 30-days average withdrawal rate criteria of their PADEP water supply permit at their Connellsville plant. Per this permit, the MAWC is required to identify an upstream water source for withdrawals between 28 MGD and 42 MGD.

1992 The MAWC requests assistance from Congress to secure the federal portion of funding for the USACE to complete a water management and storage reallocation study for Youghiogheny River Lake.

Yough River Lake
Water Management & Reallocation Study
Chronology

1993 An Initial Assessment (IA) phase of the study (100% federally funded) was completed by the USACE. The conclusion of the IA was that the potential exists to reallocate a small portion of Youghiogheny River Lake storage to water supply.

1995-97 The Reconnaissance phase of the study (100% federally funded) was completed by the USACE. The study defined a possible alternative, a public interest, and a cost sharing partner (MAWC) for

Yough River Lake
Water Management & Reallocation Study
Chronology

1999-2003 The Feasibility phase of the study (50-50 cost shared) is conducted by the USACE and the MAWC, including full public involvement.

Key Study Authorities

Section 216 of Public Law 91-611

Under this section the Corps can review the operation of Youghiogheny River Lake and report to Congress with recommendations on the advisability ot making a modification in the overall public interest.

Public Law 101-640

This law requires that any change to a water control plan, regardless of purpose, must be developed with full public involvement.

National Environmental Policy Act (NEPA) of 1969

This act addresses environmental impacts as interpreted by 40 CFR 1500-1508.

(CFR is Code of Federal Regulations)

Purpose of Study:

- Determine if we can accommodate a request for an additional 25 cfs (17MGD) from MAWC
- Determine if we can improve the current operating schedule at Youghiogheny River lake
- Evaluate impacts of proposed changes

Youghiogheny River Lake

- MAWC needs an additional 25 cfs (17mgd) to meet the their future projected water supply needs.
- Corps is willing to change how water is released during average to wet years to better meet the current needs of the Corps stakeholders.

How Much Water Are We Talking About?

Average flow rate at Connellsville (1925-1997):

= 2,620 cubic feet per second (cfs)

= 4,061 million gallons per day (MGD)

Average stage at the Connellsville gage = 3.87 feet (‘)

How Much Water Are We Talking About?

MAWC water withdrawal

20 MGD = 31 cfs

28 MGD = 44 cfs

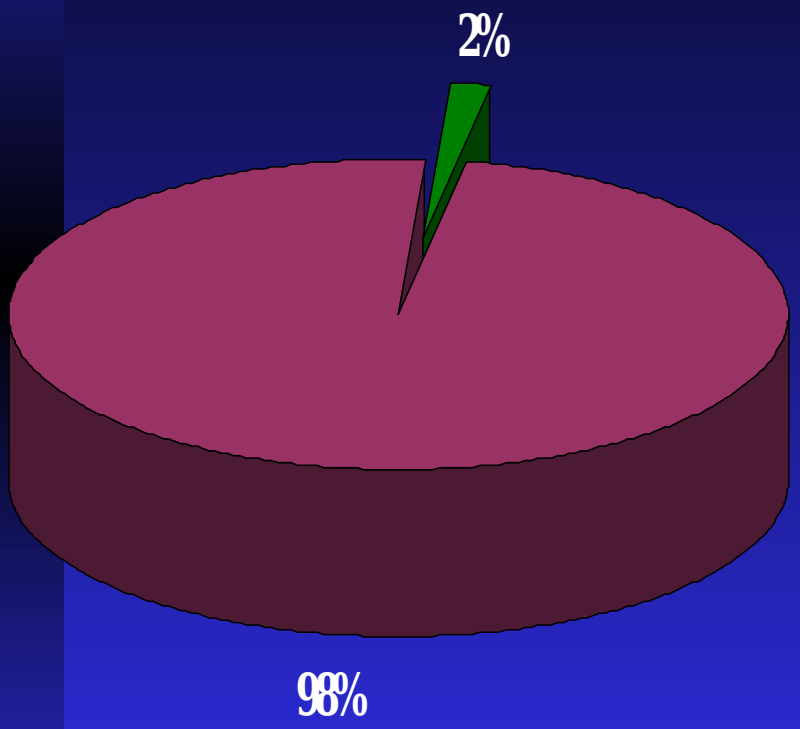
44 MGD = 69 cfs

What Happens at Connellsville?

$Q_{7\text{-}10}$ (Current) = 460 cfs

$Q_{7\text{-}10}$ (Proposed) = 490 cfs

Current
MAWC Withdrawal at Connellsville Under Average Flow Conditions



Average Flow

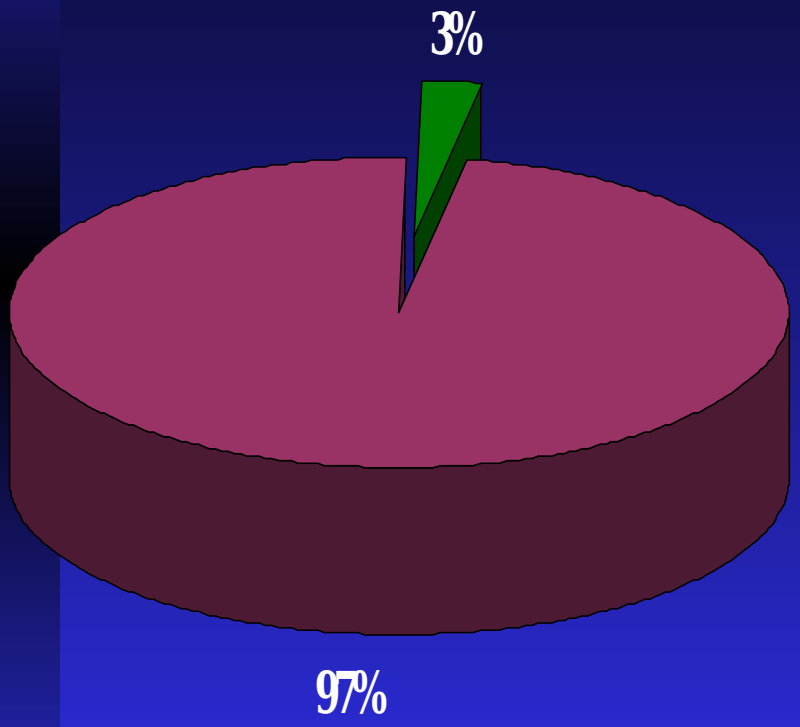
2,620 cfs

MAWC Withdrawal

2 %

Water continuing downstream

Proposed
MAWC Full Withdrawal at Connellsville Under Average Flow Conditions



Average Flow

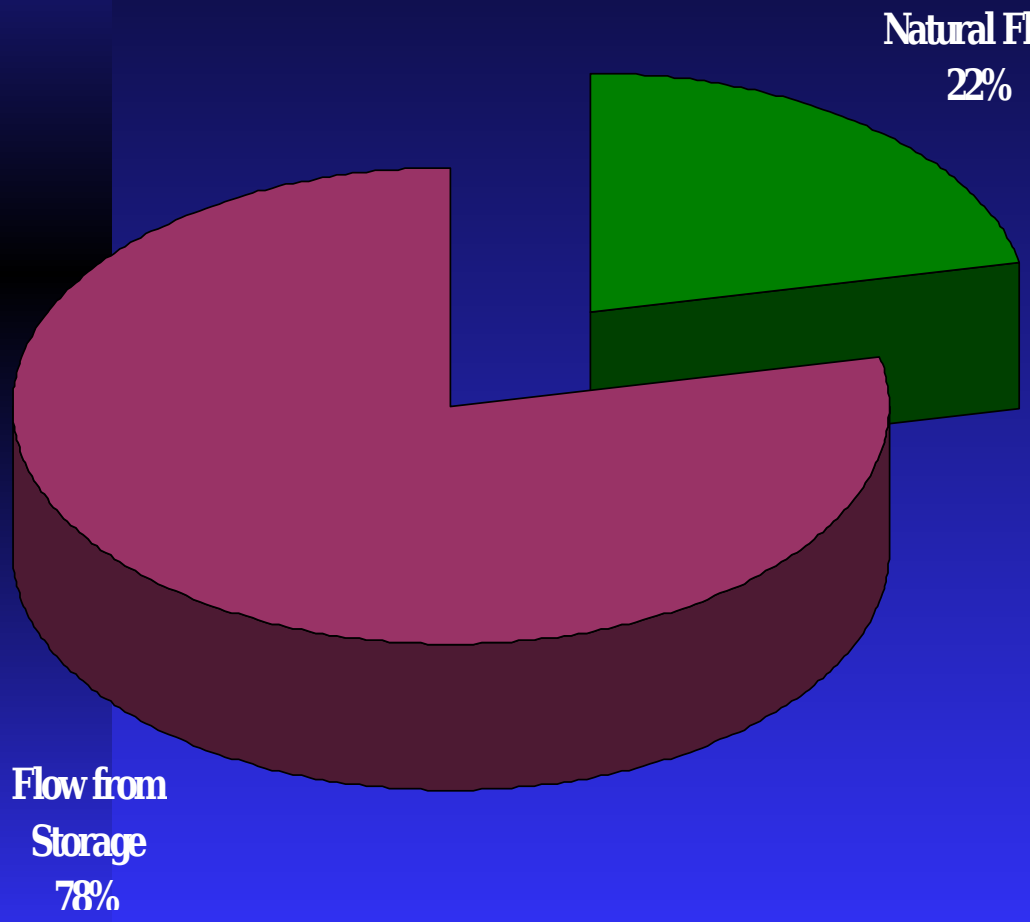
2,620 cfs

MAWC Withdrawal

3 %

Water continuing downstream

Contribution of Youghiogheny River Lake to Flow at Connellsville under Low Flow Conditions



Total Flow

460 cfs

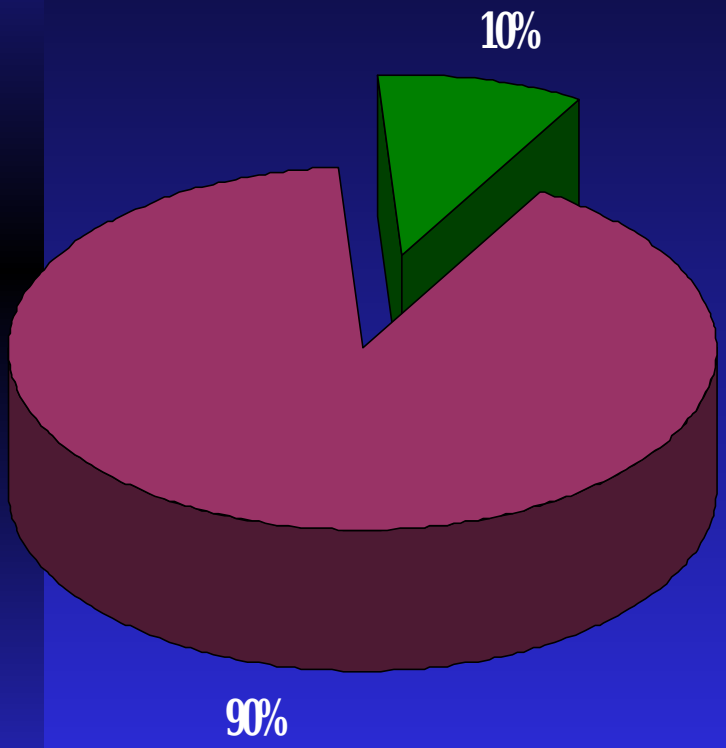
Natural flow

100 cfs

Flow from storage

360 cfs

Current
MAWC Withdrawal at Connellsville Under Low Flow Conditions



Low Flow

460 cfs

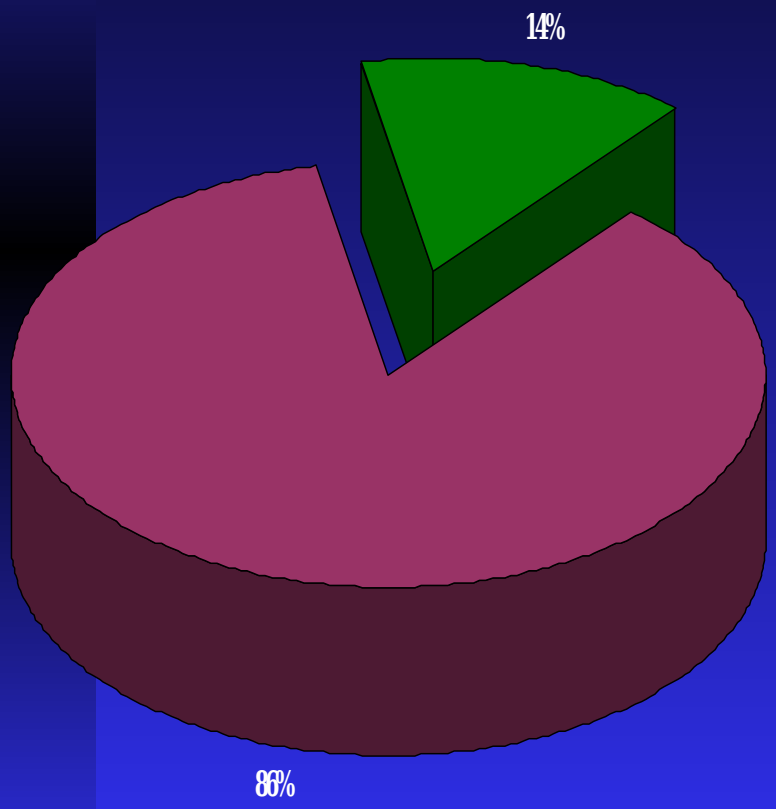
MAWC Withdrawal

10%

Water Continuing Downstream

90% (415 cfs)

Proposed
MAWC Withdrawal at Connellsville Under Low Flow Conditions



Low Flow

490 cfs

MAWC Withdrawal

14%

Water Continuing downstream

86% (420 cfs)

1997 Reconnaissance Study

- Looked at 1991 (extremely dry year) and 1992 (wet year)

- Two alternatives:
  - #1 - meets MAWC water supply request only
  - #2 - meets MAWC water supply request and reduces lake drawdowns during average and wet years

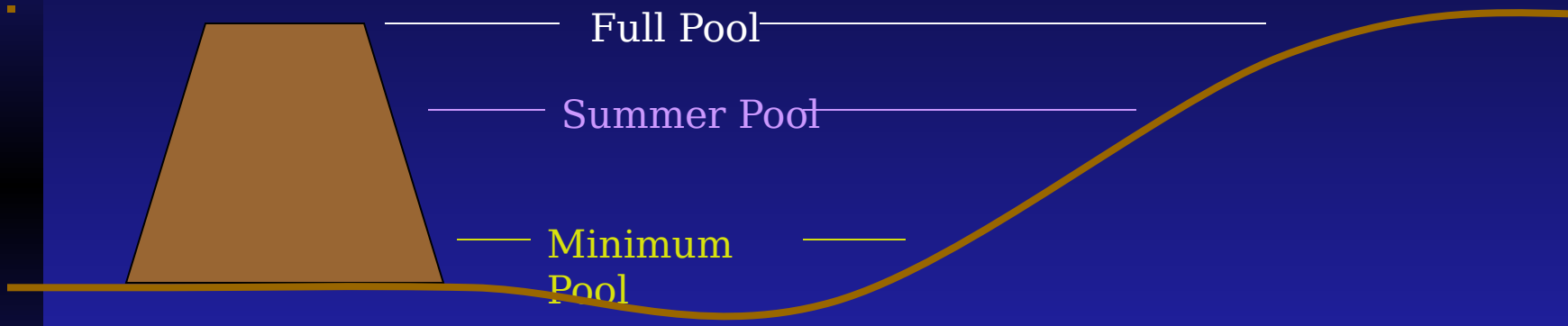
Current Feasibility Study

- Looked at the entire period of record
- Refined alternative #1 = Alternative #5
- Refined alternative #2 = Alternative #6
- Included public input

What Does the Reallocation of Storage Mean?

- Currently, Youghiogheny River Lake has 146,760 acre-feet of water for low flow regulation for water quality enhancement.
- This volume exists between the summer pool elevation of **1439.0 feet** and the minimum pool elevation of **1344.0 feet**.
- Reallocating is re-defining the use for this water to water quality “and” water supply.

How Much Water Will Be Reallocated For Water Supply?



	Current to Proposed
Flood Control (summer)	**= 39% to 39%**
Water Quality (summer)	**= 59% to 55%**
Water Supply	**=**
0% to 4% Inactive (Below Minimum Pool)	**= 2% to 2%**

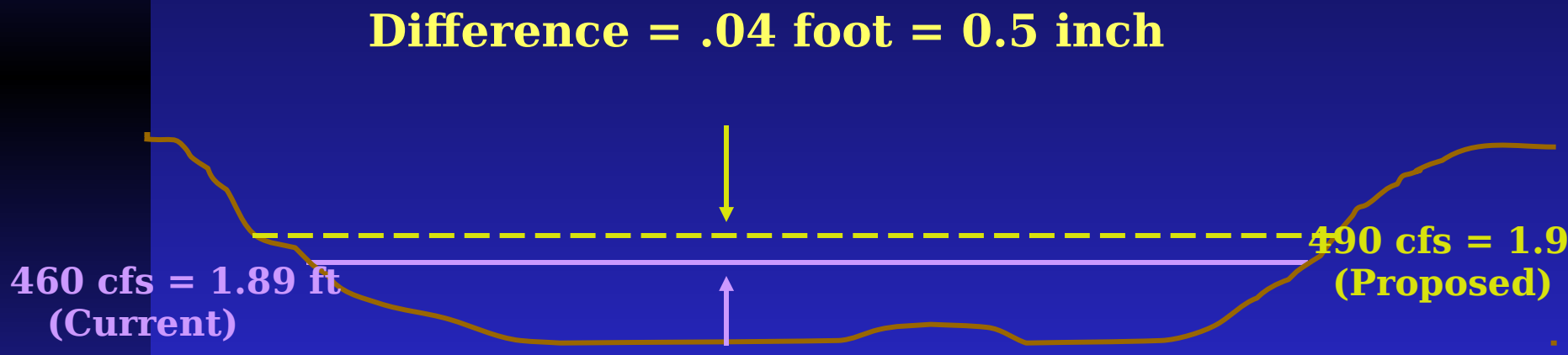
Why Doesn't the Corps Raise the Lake?

- Encroachment into this space decreases the lake's capability to store flood waters.
- The space above **Summer Pool** is for **Flood Control**.
- To maintain the same **Flood Control** Space and amount of **Low Water Regulation**, the dam would have to be raised.
- This study did not change the project's **Flood Control** capability.

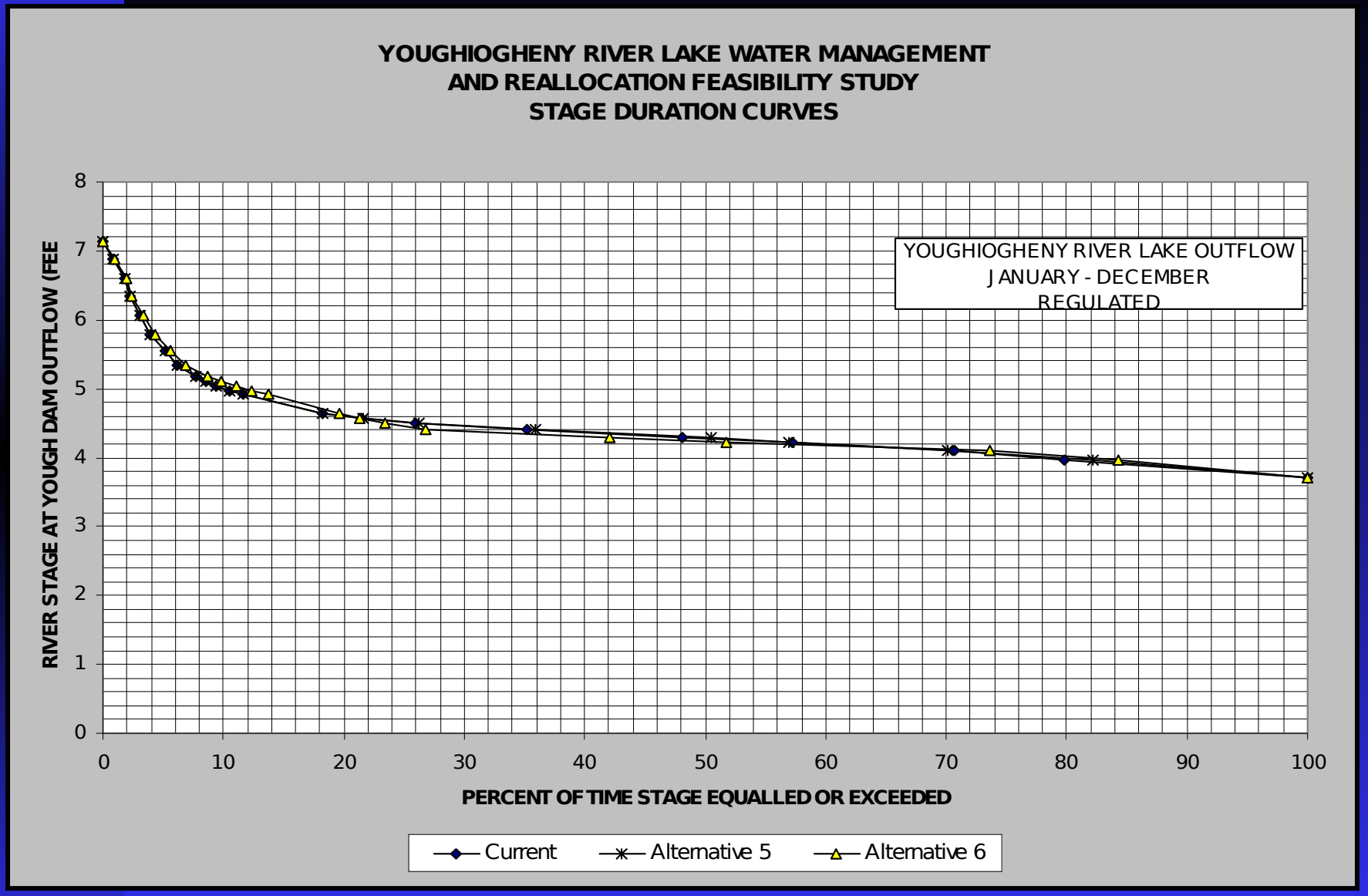
Reallocation of Storage

Uncontrolled Flow	Current Release Schedule	1997 Recon. Study Alternative #2	2003 Feas. Study Alternative #6
0-100	400	425	500
100-300	350	375	450
300-500	300	275	400
500-1000	200	175	300

What Is the Impact to the Youghiogheny River at Connellsville During Periods of Low Water?



Sample Cross Section at Connellsville


YOUGHIOGHENY RIVER LAKE WATER MANAGEMENT
AND REALLOCATION FEASIBILITY STUDY
STAGE DURATION CURVES
YOUGHIOGHENY RIVER LAKE OUTFLOW
JANUARY - DECEMBER
REGULATED
RIVER STAGE AT YOUGH DAM OUTFLOW (FEE
PERCENT OF TIME STAGE EQUALLED OR EXCEEDED
0
1
2
3
4
5
6
7
8
0
10
20
30
40
50
60
70
80
90
100
Current
Alternative 5
Alternative 6

1997 Recon Study

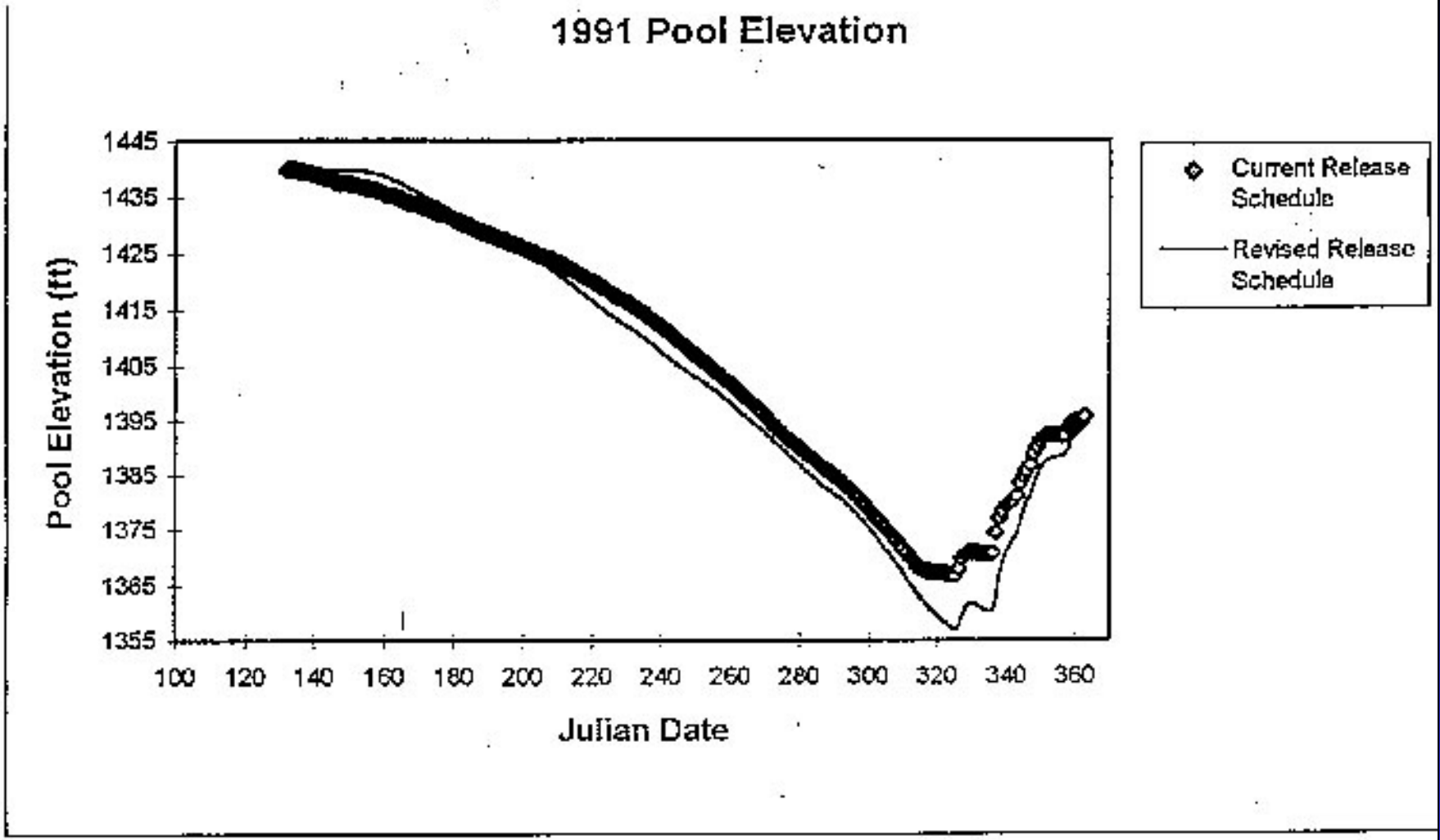


PLATE 4: Youghiogheny River Lake Pool Elevation for 1991

1997 Recon Study

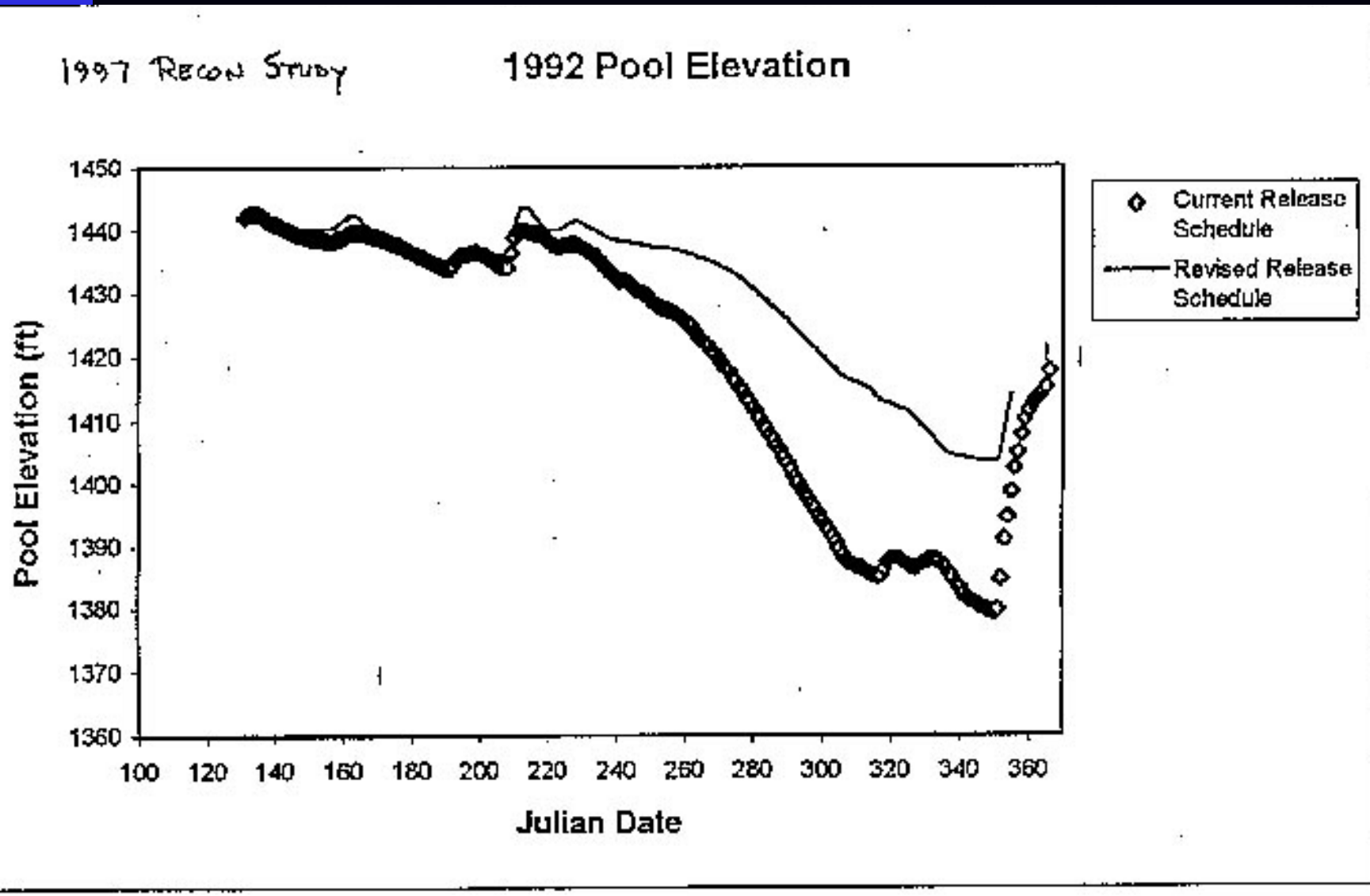


PLATE 5: Youghiogheny River Lake Pool Elevation for 1992

“Water Quantity” Summary

- The proposed release schedule change (Alternative #6).
  - Provides the projected water supply needs.
  - Provides reduced lake drawdowns during average and wet years.
  - Provides a slightly more stable river.

Water Quality Impacts

- Slight Change in Water Temperature
- Benefits from Increased Base Flows

CONCLUSION: No Significant Impacts

What Was Done in the Feasibility Study?

- Evaluated various alternatives to provide quantity needed
- Evaluated alternatives to determine potential impacts
- Solicited input from other agencies, local interest groups, and the general public during past meetings, via mail, etc.

List of Stakeholder Meetings

June 3, 1999 Study Initiation (Public) Meeting

Connellsville Municipal Building

- Outlined Feasibility Study Plan
- Informed Stakeholders
- Identified Steering Committee members

July 13, 1999 Briefing for Fayette Forward Environmental Action Committee

Fayette Forward Conference Room Uniontown, PA

List of Stakeholder Meetings

December 3, 1999 First Steering Committee (Public) Meeting
PSU, Fayette Campus – Uniontown, PA

- Presented water quantity analysis
- Solicited stakeholder feedback
- Solicited public input to identify potential environmental impacts

List of Stakeholder Meetings

January 31, 2000 Briefing for Youghiogheny River Outfitters

Federal Building – Pittsburgh, PA

June 5, 2000 Meeting with Pennsylvania Fish and Boat Commission (PAFBC)

Federal Building – Pittsburgh, PA

- Presented draft of water quality findings

List of Stakeholder Meetings

June 23, 2000 Briefing for Youghiogheny River Council

Fireman's Park – Sutersville, PA

September 7, 2000 Meeting with technical sub-committee of the Steering Committee

Federal Building – Pittsburgh, PA

- Reviewed water quantity analysis
- Presented water quality findings

List of Stakeholder Meetings

February 7, 2001 Public and Steering Committee Meeting - Connellsville, PA

- Reviewed water quantity analysis
- Reviewed water quality findings
- Began NEPA Compliance
- Solicited feedback

Most Recent Activity

- Draft feasibility report and environmental assessment was completed in November 2002.
- Public review period December 2002 – January 2003.
- Completed Feasibility Report and associated NEPA requirements completed and signed by the District Commander in October 2003.
- Prepared and negotiated a water supply

What's Next ?

- Submit documents through our chain for approval
- Approve the implementation of the Feasibility Study recommendation (including the execution of the water supply agreement).
- Implement sometime in 2004.

Lessons learned

- Keep it simple – A huge challenge for technical people.
- Be careful with the words that you use

  (MGD vs CFS, Q 7-10)
- Don’t under-estimate the damage caused by those who use the public forum for posturing.